

Political Accountability and Bureaucratic Selection*

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Abstract

The selection of public sector employees is crucial to state effectiveness. Given politicians' influence on bureaucracies, could political accountability improve bureaucratic selection? Using randomized audits and individual-level data on Brazil's public sector employees, this paper finds that audits enhance the quality of the bureaucracy. The results are driven by politicians' increased incentive to perform well in office, stronger recruitment effort, and a reduction in patronage.

Keywords: Transparency, Accountability, Bureaucratic Selection, State Capacity

JEL Codes: H11, O20, P00

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1. Introduction

Bureaucratic selection is a key determinant of state performance.¹ Yet, many parts of the world, especially in developing countries, face a shortage of qualified public sector employees. How can we address this problem? In this paper, we posit that since politicians influence bureaucracies, increasing political accountability may improve the quality of the bureaucracy.

Brazil is an ideal setting for testing this hypothesis for three main reasons. First, municipal bureaucracies in Brazil are representative of many local bureaucracies in developing countries. On one hand, they employ a large share of the public sector workforce (more than half of all public employees in the country) and are essential in delivering key public services, such as health and education. On the other hand, they are hindered by weak performance incentives, patronage, and an unqualified workforce (see, e.g., [Colonnelli et al. \(2020\)](#)). Second, we can exploit randomized audits conducted in 1,949 municipalities between 2003 and 2015 as exogenous political accountability shocks (as, e.g., [Avis et al. \(2018\)](#)), enabling a credible test of our hypothesis by comparing bureaucratic selection patterns in audited municipalities relative to a large number (3,359) of never-audited municipalities, within a staggered differences-in-differences design.² Third, we can leverage individual-level matched employer-employee records (from RAIS) to gather data on the educational attainment and occupation of every municipal public sector employee, allowing us to construct detailed measures of their qualifications (in a vein similar to [Colonnelli et al. \(2020\)](#)).

Our findings reveal that audits lead to a sustained improvement in the quality of the bureaucracy. On average, audits increase the number of qualified employees by 4.4%, with no impact on the number of unqualified employees. The increase in qualified employees is particularly strong for frontline occupations which directly affect the quality of public service delivery and require qualifications to be performed effectively – such as teachers, doctors, and nurses. Audits increase the number of qualified individuals hired for these professions by 8.4%. We provide suggestive evidence on the importance of these hires for public service outcomes by

¹The selection of public sector employees affects the delivery of education ([Busso et al., 2024](#); [Muñoz and Prem, 2024](#); [Leaver et al., 2021](#); [Brown and Andrabi, 2020](#); [Estrada, 2019](#)), healthcare ([Otero and Munoz, 2022](#); [Weaver, 2021](#); [Deserranno, 2019](#)), justice ([Dahis et al., 2023](#); [Brassiolo et al., 2021](#)), public safety ([Ornaghi, 2019](#)), and postal services ([Aneja and Xu, 2024](#)). It also impacts tax collection ([Xu, 2018](#)), wartime performance ([Voth and Xu, 2020](#)), and broader measures of state performance ([Riaño, 2023](#)).

²Anti-corruption programs and the institutions that implement them have proliferated across the developing world, existing in countries such as India (Central Vigilance Commission), Brazil (Office of the General Comptroller), South Africa (Special Investigating Unit), Mexico (Superior Audit Office of the Federation), Indonesia (Corruption Eradication Commission), and Nigeria (Independent Corrupt Practices and Other Related Offences Commission).

showing that, at school level, the number of qualified frontline providers (i.e. teachers) correlates robustly with test scores.³ Given the rigidities in firing in the Brazilian public sector (as in many other countries), this improvement in bureaucratic selection has the potential to permanently enhance the provision of public services.

We argue that audits, by strengthening political accountability (Ferraz and Finan, 2008; Avis et al., 2018), increase mayors' incentive to perform well in office. To achieve this objective, mayors reduce patronage and demand new qualified hires to be made.⁴ To attract better workers, wages paid to new qualified hires are increased.⁵ Results from additional empirical exercises support this interpretation. First, the increase in the number of qualified employees is accompanied by a rise in wages paid to new qualified hires (with no effect on wages paid to new unqualified hires).⁶ Second, audits reduce the share of municipal public sector jobs that are allocated to campaign donors of the mayor (a measure of patronage, as in e.g. Colonnelli et al. (2020)). Third, there are no effects on the quality of public sector employees hired by the state or federal government – whose hiring mayors cannot easily influence –, suggesting that bureaucratic selection does not improve independently of the mayor. Fourth, results are entirely driven by audits that reveal above-median levels of corruption or affect a mayor that is not term-limited – i.e. those which, by reducing the incumbent's re-election chances, induce the strongest political accountability shock (Ferraz and Finan, 2008).

Additional results lend less support to alternative explanations. First, the absence of effects on the share of employees hired via civil service examination is inconsistent with the idea that the improvement in bureaucratic selection is mediated by an increase in meritocratic hires. Second, the lack of change in the average age of public sector employees is inconsistent with the idea that the improvement in bureaucratic selection is a mechanical consequence of new hires being disproportionately drawn from younger cohorts, which are more educated on average.⁷

The key takeaway from this paper is that, since politicians influence bureaucracies, the quality of the bureaucracy can increase if political accountability increases. Our work primarily

³This resonates with point 4.c and metric 4.c.1 within the UN's Agenda 2030, whereby the hiring of qualified teachers is seen as a way to attain Goal 4 ("Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all").

⁴Mayors in Brazil hold significant sway over discretionary and non-discretionary hires in the municipal bureaucracy, and patronage hires are of lower average quality (see, e.g. Colonnelli et al. (2020)).

⁵It has been documented that offering larger wages is an effective way of attracting better workers to the public sector (see, e.g., Bobba et al. (2021); Ashraf et al. (2020); Dal Bó et al. (2013)).

⁶Although not directly testable, it is possible that these new costlier hires are funded by the sizable reduction in corruption leakage that is induced by the audits, as documented in Avis et al. (2018).

⁷This echoes the results found in Xun (2024), showing that audits reduce the attractiveness of public sector positions for recent college graduates.

contributes to the literature on how transparency and accountability affect key determinants of state capacity.⁸ A large literature has focused on studying how transparency and accountability affect corruption, finding negative results overall (Avis et al., 2018; Zamboni and Litschig, 2018; Bobonis et al., 2016; Olken, 2007; Di Tella and Schargrodsky, 2003). Relative to this literature, our main contribution consists in studying how political accountability affects bureaucratic selection, a different determinant of state capacity which has received increasing attention.⁹ Our results indicate that political accountability has the potential to improve state capacity not only by reducing the leakage of resources via corruption, but also by enhancing bureaucratic selection. Moreover, by documenting negative effects on patronage, our paper shows that substitution effects of the form described in Olken (2007) – whereby politicians substitute towards untargeted forms of corruption in response to transparency shocks –, which have received attention in the literature (see, e.g., Fisman and Golden (2017); Gagliarducci and Manacorda (2020); Gerardino et al. (2024)), may not always materialize.¹⁰

By focusing on how political accountability affects bureaucratic selection, our paper is most closely related to the recent literature studying how transparency and accountability affect the bureaucracy.¹¹ Jävervall (2022) studies the effects of a different transparency policy (a law requiring wealth disclosure by candidates) on the extent of skill-task mismatch in the IAS – the topmost layer of the government bureaucracy in India. We differ from this paper by studying the effects of a policy that directly informs voters about politicians’ performance on the quality of hires across all bureaucratic layers. Studying the same audits program in Brazil, Gonzales (2021) shows that audits increase the hires of the local bureaucracy without improving public service delivery. Based on these results, these papers conclude that audits lead to inefficient hiring by the public sector. However, assessing the quality of these hires based on how audits affect public

⁸An influential body of literature examines the effects of accountability interventions on the effectiveness of public service delivery per se, finding positive results overall (Dupas and Jain, 2023; Muralidharan et al., 2021; Banerjee et al., 2020, 2018; Björkman Nyqvist et al., 2017; Dhaliwal and Hanna, 2017; Reinikka and Svensson, 2011; Björkman and Svensson, 2009; Reinikka and Svensson, 2005).

⁹It has been shown that attracting better bureaucrats via financial and career incentives (Bobba et al., 2021; Deserranno and León-Ciliotta, 2021; Leaver et al., 2021; Ashraf et al., 2020; Brown and Andrabi, 2020; Deserranno, 2019; Dal Bó et al., 2013) and selecting them via rules-based competitive civil service examinations (Aneja and Xu, 2024; Dahis et al., 2023; Muñoz and Prem, 2024; Otero and Munoz, 2022; Estrada, 2019; Ornaghi, 2019) or discretion (Weaver, 2021; Riaño, 2023; Colonnelli et al., 2020; Voth and Xu, 2020; Xu, 2018) affects state effectiveness.

¹⁰In fact, our results echo those in Barbosa and Ferreira (2023), who, in the same context, find that audits reduce the effect of a particular political group rising to power on the share of jobs allocated to individuals belonging to that group.

¹¹By drawing a link between transparency, political incentives and bureaucratic outcomes, this growing body of work is closely related to the growing literature on the organizational economics of the state (recently discussed by Besley et al. (2022)).

service delivery is challenging since audits affect other determinants of public service delivery besides public sector hires, such as the amount of federal transfers to municipalities (Brollo et al., 2008), corruption (Avis et al., 2018), tax compliance (Montenegro, 2020), and economic activity (Colonnelli and Prem, 2022). To address this challenge, we examine the *direct* effects of audits on the quality of bureaucrats. Our approach aims to cleanly identify how audits impact the quality of hires, and is motivated by recent research emphasizing the importance of the match quality between bureaucrats and their tasks for state performance (Xu, 2023; Bergeron et al., 2022; Spenkuch et al., 2023; Limodio, 2021; Xu et al., 2023).¹² Finally, Xun (2024) studies, in the same context, how audits affect the career choices of students. He finds that audits lead to a lower share of high-ability students working as civil servants. Relative to this paper, our work documents a sizable improvement in aggregate bureaucratic selection patterns that occurs despite the changing preferences of recent college graduates.

The remainder of this paper proceeds as follows. Section 2 describes Brazil’s randomized audits program, municipal civil service, municipal elections, and municipal public education. Section 3 details our data, presents descriptive statistics, and delineates our empirical strategy. Section 4 presents our results on the dynamic effects of audits on bureaucratic selection and explores the mechanisms underlying those effects. Section 5 presents suggestive evidence on the importance of qualified hires for public service delivery. Finally, Section 6 concludes.

2. Background

2.1. Federal Audits

In May 2003, the Brazilian central government announced the Monitoring Program via Public Lotteries (*Programa de Fiscalização por Sorteios Públicos*), a large-scale program aimed at detecting and preventing corruption and mismanagement in the allocation of federal resources. The program, operational from 2003 to 2015, encompassed 40 rounds of random selection of municipalities. The audits were carried out by the Office of the Comptroller General, known as the Controladoria Geral da União (CGU), a federal agency entrusted with the mission of preventing corruption at the federal level and overseeing activities involving the utilization of

¹²When looking only at the period between 2001 and 2004, Lauletta et al. (2022) find that audits reduce the number of local bureaucrats required to provide a given level of public services. In this paper, besides studying direct effects of audits on the quality of bureaucrat (due to the aforementioned reasons), we use a more general sample, encompassing the entirety of the program (2003-2015).

public resources. The random draws were conducted by a large public bank in Brazil, *Caixa Econômica Federal*, and were televised and monitored by the press, political parties, and civil society members.

The lotteries were drawn with replacement, but municipalities audited in recent rounds were ineligible. At first, municipalities audited in any of the previous three rounds were ineligible. However, this rule changed over time, going from 3 to 12 rounds. The randomization was stratified by state and round. State capitals or municipalities with populations exceeding a specified threshold were ineligible. The population threshold was initially set at 100,000 at the beginning of the program, but it was eventually raised to 500,000. Some draws also had a minimum population threshold of 10,000 inhabitants. As of 2014, 5,476 municipalities were eligible, representing more than 99% of Brazil's 5,570 municipalities and about 70% of the country's population. The annual median number of audit rounds was 3. During each audit round, approximately 60 municipalities were chosen randomly. However, due to fluctuations in the federal budget, the frequency of lotteries (audits) conducted each year also experienced variations, ranging from 7 (400) in 2004 to 3 (180) in 2007, eventually reduced to just 1 (60) in 2013. Figure 1 depicts this pattern. While the implied audit probabilities in any given lottery round and year were quite small (an average of approximately 1 and 3 percent, respectively), the probability of being audited in a 4-year political term could be quite high depending on the state, ranging from 8.6% to 26.4%. By the end of the program, over R\$22 billion worth of federal funds had been audited, and 1,881 municipalities had been audited at least once. Figure 2 shows the spatial distribution of ever-treated municipalities.

Once a municipality was selected, the audit process began shortly after the lottery draw. Ten to fifteen competitively hired and paid auditors were dispatched to the municipality for one to two weeks. They aimed to determine whether earmarked federal transfers had been utilized under the prescribed guidelines. The auditors searched for signs of mismanagement and corruption, such as diversion of funds, noncompetitive bidding in the procurement contracts, incompleteness, or non-utilization in specific federally-funded projects and public works. The audits mainly uncovered irregularities related to procurement processes, as these are the standard way of diverting federal funds (Avis et al., 2018). Importantly, the randomized audits program did not target improving the quality of hires by the municipal public sector.

Upon the completion of their inspections, the auditors compiled a comprehensive report documenting all irregularities related to the utilization of federal resources. These reports

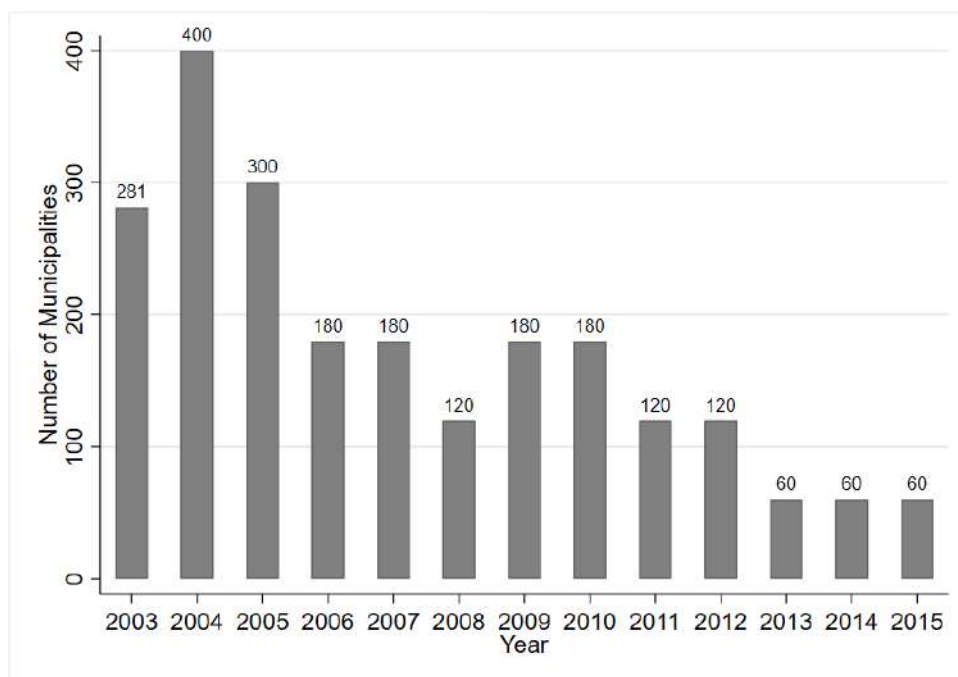


Figure 1: Number of Audits Over Time

Notes: This figure reports the yearly total number of audits using administrative data from CGU for 2003–2015.

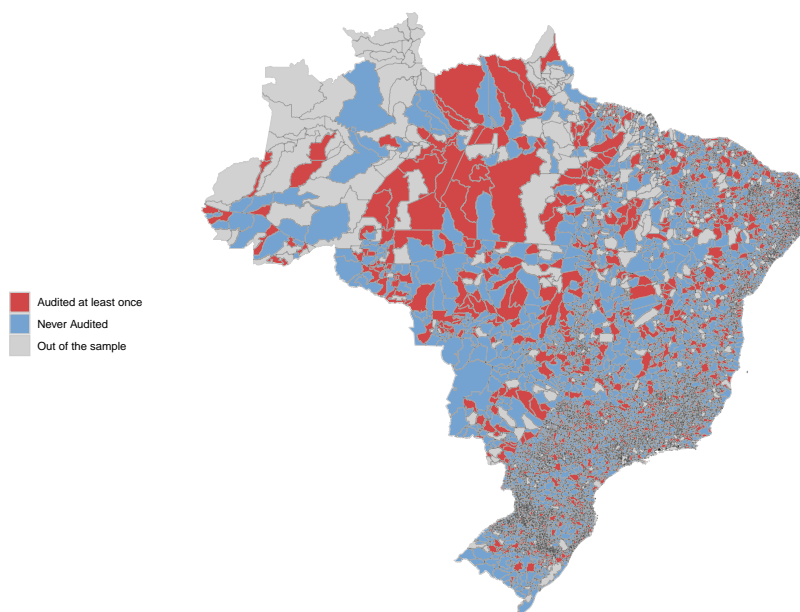


Figure 2: Ever-Audited Municipalities

Notes: This figure depicts the treatment status of Brazilian municipalities based on administrative data from CGU for 2003–2015. Audited municipalities are highlighted in red, eligible but never-audited municipalities are marked in blue, and always-ineligible municipalities are shaded in gray.

were then submitted to the central CGU office. The central unit, in turn, consolidated this information into publicly accessible reports, which were disseminated through various media channels, including the Internet, newspapers, television, and radio. The local radio stations even reported on the audit results of neighboring municipalities, further enhancing public awareness. The information in these reports was also used in political campaigns. Ultimately, the CGU forwarded the reports to the relevant administrative and judicial government bodies, initiating the process of prosecuting any corruption cases and pursuing administrative or legal penalties and fines. The most common legal outcomes resulting from these audits included the suspension or removal of public officials from their positions, or the forfeiture of a mayor's mandate.

2.2. Municipal Civil Service

Municipal bureaucracies employ over half of all public sector employees in Brazil and play key roles in providing public services such as health and education. The Brazilian constitution establishes that municipalities have to rely on transparent rules and requirements for selecting civil servants. More specifically, most civil servants must undertake a formal, competitive, open entrance examination (*concurso público*), whose requirements are job-specific and can include written and oral tests and the submission of academic and professional credentials. Once hired, civil servants enjoy tenure, and cannot be easily fired. Although an educational level satisfying the suggested educational level of the position is desirable (e.g. a full tertiary degree for a public school teacher), hiring workers without the recommended qualifications is not illegal and often occurs due to a lack of qualified candidates. Hiring committees comprise top and middle bureaucrats who respond directly or indirectly to mayors. Therefore, mayors can demand higher stringency from the hiring committees, to increase the quality of hires.

In addition to the positions filled through competitive exams, there are discretionary positions appointed by mayors. For these positions, mayors have the ability to directly control the quality of hires (e.g. by choosing only candidates that satisfy a minimum educational requirement). These positions fall into the following categories: commissioned positions (*cargo em comissão*), positions of trust (*função de confiança*), temporary jobs (*emprego temporário*), and political appointees (*cargo de natureza política*). Hiring in the first two categories is limited to high-level public officials' positions (directors, managers, supervisors, advisors, and administrative assistants). Temporary jobs are defined by politicians or high-level public officials and intended to give municipalities flexibility to meet temporary hiring needs. Finally, political appointees, the

smallest share of municipal public sector workers, are mostly municipal managers, supervisors, and advisors.

2.3. Municipal Politics

Municipalities in Brazil are governed by an executive branch led by the mayor and a legislative branch represented by the city council. The mayor’s tenure is restricted to a 4-year term, and mayors in their first term can seek re-election. Mayors are affiliated with specific political parties and typically garner support from a coalition of parties. Both politicians and citizens can support local parties or the coalition by becoming party members and making financial contributions, such as donations. Donations made by individuals can be made directly to political parties or the campaigns of mayoral or council candidates affiliated with a specific party.

2.4. Municipal Public Education Services

One of the main responsibilities of municipal governments is the provision of public education. Municipalities are mainly responsible for basic education (early childhood and elementary education). The funding of municipal education services comes primarily from higher levels of government. The municipality is responsible for all decisions regarding the daily operations of the school: distributing school lunches, providing school transportation, and hiring, paying, and training of school personnel (teachers, headmasters, and administrators).

3. Empirical Approach

3.1. Data

Audits We use publicly available information on all lottery rounds from Brazil’s Comptroller Office (*Controladoria Geral da União*, CGU). Based on this information, we build a comprehensive dataset that comprises detailed information regarding the audits, such as the dates of occurrence, municipalities under scrutiny, and the reports outlining all irregularities identified by auditors.¹³ Our primary analysis focuses on all audit rounds (lotteries 1-40), which took place between 2003 and 2015. Furthermore, we integrated metrics related to detected levels of mismanagement and corruption, specifically for lotteries 22-38, as outlined in [Avis et al. \(2018\)](#). These metrics are built from reports in which auditors classify irregularity as an act of mismanagement, an act of

¹³Available at [CGU \(2021a\)](#) and [CGU \(2021b\)](#).

moderate corruption, or an act of severe corruption. Following [Avis et al. \(2018\)](#), we define as corruption the irregularities classified as moderate or severe in the CGU reports. On average, the audits revealed 2.5 instances of corruption and 0.88 cases of mismanagement per service order. Based on this data, we build a municipality-by-year panel containing the year in which each municipality was audited for the first time and the total amount of times it was audited before (if ever).

Municipal Public Sector Employees Our primary data source about municipal public sector employees is the *Relação Anual de Informações Sociais* (RAIS), administered by the Ministry of the Economy (*Ministério da Economia*).¹⁴ This dataset is derived from annual surveys of the formal labor market and is widely used and well-established in terms of quality, as evidenced by previous studies (e.g., [Colonnelli et al. \(2020\)](#)). It consists of a rich panel of data that reports administrative information on the universe of formal labor contracts, which we use to identify municipal public sector employees in Brazil over time (public sector employees work in the formal sector). It includes a rich set of worker characteristics, such as employer, occupation, education, type of labor contract, wage, whether the worker was hired or fired that year, gender, age, and race. Importantly, we can observe a unique identifier for each worker, called individual tax identifier (CPF), which allows us to merge public sector employees in RAIS to campaign donors in the TSE data (described below).

In building our dataset, we implement standard RAIS cleaning procedures, excluding a given individual’s secondary jobs (i.e., those that pay less and are of smaller tenure) in a given year. Following [Colonnelli et al. \(2020\)](#), we classify as municipal public sector employees individuals employed by the municipal government, excluding elected officials. Moreover, we classify all public sector occupations into four categories: managers (ISCO major group 1), e.g. school principal, hospital manager; frontline-high skill (ISCO major groups 2 and 3), e.g. teachers, doctors, nurses; bureaucrats (ISCO major group 4), e.g. administrative assistant; and frontline-low skill (remaining ISCO major groups except for “Armed Forces”), e.g. garbage collector.

We classify managers and frontline-high-skill (FHS, henceforth) workers as qualified if they have completed a tertiary degree and bureaucrats if they have completed a secondary degree.

¹⁴ Access to RAIS was generously provided by FGV-EESP through a formally signed agreement. Researchers interested in using this dataset must find a Brazilian institution willing to partner in providing the data, as per the current regulation. For more information, visit <https://www.gov.br/pt-br/servicos/solicitar-acesso-aos-dados-identificados-rais-e-caged>.

Since the educational level is plausibly not the main determinant of performance for frontline-low skill professions, we cannot test how the audits affected the quality of hires for these positions. Colonnelli et al. (2020) incorporate information on the official educational prerequisites for a subset (not the universe) of all occupations to categorize municipal public sector employees as qualified or unqualified. We use their classification in a robustness check, finding similar results.¹⁵ Finally, we use information about the labor contract to identify individuals hired via civil service examination (*servidor publico efetivo*).

Using this individual-level data, we construct a municipality-by-year panel that aggregates measures of the quality of bureaucratic selection. We focus on the stock of municipal public sector employees who meet the minimum educational requirements for the positions they hold compared to the stock of employees who do not meet these criteria. We denote the first category as “qualified” employees and the second as “unqualified” employees. We compute this measure across and within the three occupational groups that require a certain degree of educational attainment to be performed effectively (managers, FHS, and bureaucrats).

Due to multiple zero counts (e.g. 28% of the municipalities lacked managers in 2002), we apply the $\log(x + 1)$ transformation to counting variables (e.g. total number of qualified employees). This ensures a balanced panel and comparability of the results across occupational categories.¹⁶

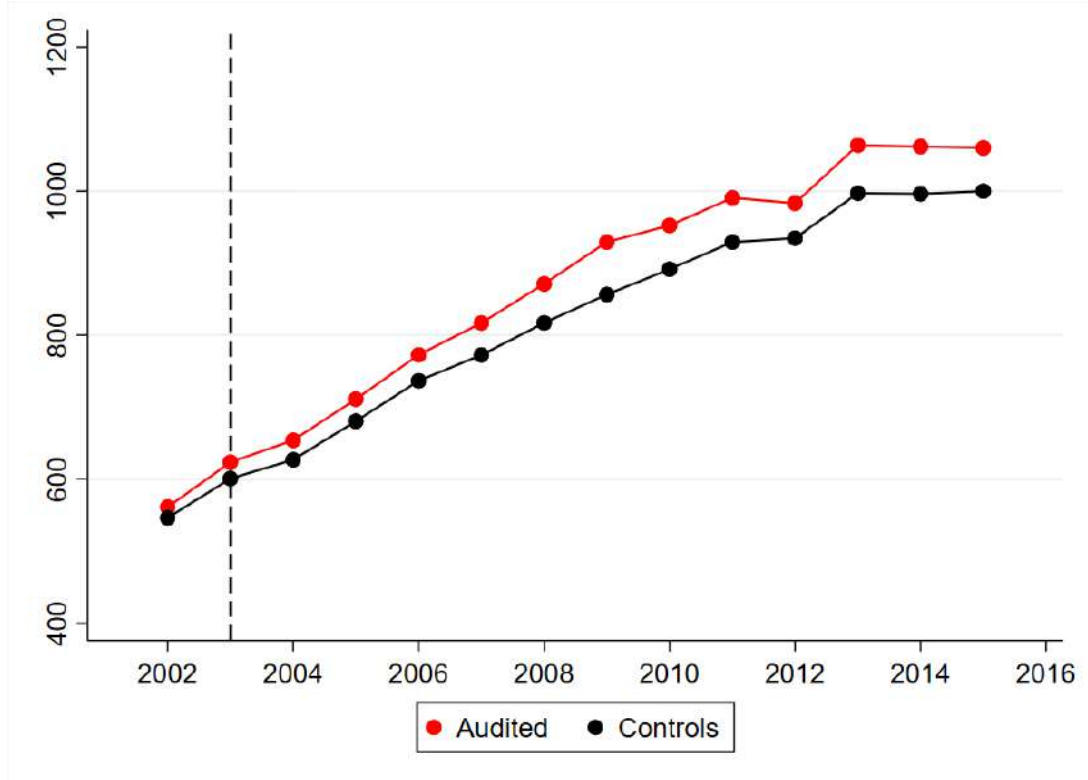
Figure 3 shows the total number of employees identified as belonging to the municipal public sector from 2002 to 2015. The red line represents the trend for municipalities audited during the period, while the black line represents never-audited municipalities. We observe an increasing trend in the total number of employees in both groups. However, although the numbers were similar in 2002, the number of employees grew more in the audited municipalities. This result aligns with previous evidence indicating that audits influence the size of the bureaucracy (Gonzales, 2021). As will be shown later, this increase was completely driven by qualified hires.

Mayors and Campaign Donors We use publicly available data on electoral records from the 2000, 2004, 2008, 2012, and 2016 municipal elections from Brazil’s preeminent electoral

¹⁵For practical purposes, the key difference between our measure and theirs lies in the fact that we require technicians (ISCO major group 3, a subset of FHS employees) working in the health and education sectors to have a full tertiary degree in order to be classed as qualified. These individuals mainly work as nursing technicians, dental technicians, early childhood teachers, and other similar professions. In Brazil, individuals intending to work in these professions generally take “technical courses”, which are a form of tertiary education.

¹⁶As will be shown later, we also run our main regressions applying the $\log(x)$ transformation to counting variables, in a robustness check. The results hold.

Figure 3: Number of Municipal Public Sector Employees



Notes: This figure depicts the number of municipal public sector employees based on administrative data from RAIS for 2002–2015. Audited municipalities are highlighted in red, eligible but never-audited municipalities are marked in black.

justice institution, the *Tribunal Superior Eleitoral* (TSE).¹⁷ This dataset provides information about election outcomes, encompassing data on elected mayors' profiles, candidate details, party affiliations, coalition alignments, and the number of votes garnered. It also includes the total votes received by each candidate in the municipality, alongside the candidate's gender, education level, age, and political allegiance. This dataset provides us with observable characteristics of the elected mayor for each municipality. It allows us to discern whether they face term limits (by being in their second or first term in office, respectively). In particular, this allows us to know whether an audit occurred in a municipality where the incumbent could run for re-election.

For elections from 2004 to 2016, TSE also provides publicly available data on campaign donors. For non-corporate donors, we can identify their tax identifier (CPF), the amount of money they donated, and the candidate or party they financed. We identify donors who donated to winning mayors and match them perfectly to RAIS via their CPF. This allows us to compute our measure of the prevalence of patronage, namely the stock of municipal public

¹⁷Available at [TSE \(2021\)](#).

sector employees who donated to the incumbent mayor (as Colonnelli et al. (2020)).

Teachers and Test Scores The data on municipal education services comes from two sources made available by the National Institute for Research on Education (*Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, INEP*). The first is the School Census (*Censo Escolar*), an annual survey of every school in Brazil, private and public. We use the School Census from 2009, 2011, 2013 and 2015 to build a panel of schools with the following information: characteristics of the school (such as the quality of its infrastructure), school-level student characteristics (such as their race), school-level teacher characteristics (such as education).¹⁸ We use this last measure to compute the number of teachers with a complete higher education degree. Our second source of education data is *Prova Brasil*, a nationwide, standardized exam administered every two years since 2007 to all 4th and 8th graders in public schools that have at least 20 students enrolled in that particular grade level. This assessment is a low-stakes assessment conducted by the federal government to evaluate the progress of students' cognitive ability nationwide. We use *Prova Brasil* data from 2009, 2011, and 2013 and 2015 to measure student achievement. For each student, we average her math and Portuguese language test scores.

Other Data We obtain baseline municipality-level characteristics from the 2000 Census from *Instituto Brasileiro de Geografia e Estatística* (IBGE), to evaluate balance across treatment assignment.¹⁹ The 2000 population census has information on various socioeconomic and demographic characteristics, such as municipal income per capita, income inequality, poverty incidence, population density, the proportion of the population residing in urban areas, informality, and the literacy rate.

Our final estimation sample consists of a balanced municipality-by-year panel combining information from administrative sources. To make the interpretation of the results clearer, we drop from the sample: (i) municipalities that were never eligible for the program (i.e. state capitals and municipalities with a population above 500,000, which represent 0.8% of municipalities), (ii) municipalities that were audited multiple times (4.9% of municipalities) and (iii) municipalities without information about municipal public sector employees (6.3% of municipalities). Our final sample has a set of 4,914 municipalities.

Table 1 presents descriptive statistics for our main sample's municipal public sector employees.

¹⁸Our panel starts in 2009 because this is the first year for which data on teachers' characteristics is available.

¹⁹Available at <https://loja.ibge.gov.br/catalogsearch/result/?q=censo>.

In summary, FHS employees constitute a significant portion of the public municipal workforce, accounting for approximately 40%. The other groups comprise a lesser share of the municipal bureaucracy: frontline low-skill employees 35.7%, bureaucrats 16.7%, and managers 8.0%. There is an average of 828.3 employees overall. Excluding frontline low-skill employees, 301.8 are qualified, and 260.0 are unqualified.

The data shows that 33.1% of public sector employees are unqualified. At 53.2%, this percentage is significantly greater among FHS employees (e.g., a teacher without a full tertiary degree). As mentioned before, this is to be expected, since (i) the state may not exert sufficient recruitment effort, which can be crucial given the low supply of qualified individuals and (ii) it is not a crime to hire individuals that do not have the recommended educational level. This is even though a majority of the workforce (80.9%) was hired via civil service exams (this share is 83% for FHS workers). In fact, analyzing the employees hired through civil service exams, we find that 31.4% of them are unqualified, which is comparable to the percentage of unqualified public sector employees in general (note that these are different positions, comparing e.g. a teacher to a secretary of health). Additionally, 0.8% of the workforce comprises past donors of the incumbent mayor.

Table 1: Descriptive Statistics - Municipal Public Sector Employees

	Mean	SD	Median
<i>Panel A: Composition by Occupational Category (%)</i>			
Share of Managers	8.0	14.3	4.4
Share of Bureaucrats	16.7	17.7	11.5
Share of Frontline High Skill	39.6	14.7	40.2
Share of Frontline Low Skill	35.7	14.5	37.9
<i>Panel B: Count</i>			
Number of Employees	828.3	1282.5	424.0
Number of Qualified Employees	301.8	638.4	120.0
Number of Unqualified Employees	260.0	423.3	130.0
<i>Panel C: Skill-Task Mismatch (%)</i>			
Share of Unqualified	33.1	17.0	30.3
Share of Unqualified, Managers	69.8	24.2	73.8
Share of Unqualified, Bureaucrats	27.3	20.9	22.7
Share of Unqualified, Frontline High Skill	53.2	25.3	51.1
<i>Panel D: Merit-based Hiring (%)</i>			
Share Hired via Civil Service Examination	80.9	23.0	89.4
Share Hired via Civil Service Examination, Frontline High Skill	83.0	24.5	95.1
Share of Unqualified, hired via Civil Service Examination	31.4	18.2	28.1
<i>Panel E: Patronage (%)</i>			
Share of Donors	0.8	1.5	0.4
Share of Donors, Frontline High Skill	0.7	2.4	0.0
Observations	68,796		

Notes. This table presents descriptive statistics for municipal public sector employees in our regression sample. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. Our source is RAIS, and the sample is at the municipality-year level.

3.2. Empirical Strategy

Our empirical strategy exploits the randomized audits as an exogenous transparency shock. It compares bureaucratic selection patterns in audited municipalities to those in never-audited municipalities within a staggered differences-in-differences design. Our identifying assumption is that, in the absence of an audit, bureaucratic selection patterns in ever-treated and eligible but never-treated municipalities would have followed parallel trends. The absence of pretrends in the results presented below will support this assumption. The balancing results in Table 6 in Appendix 6 provide further evidence supporting our design.

Regarding estimation, since treatment effects might be heterogeneous over time or across municipalities, we obtain our results using the robust estimator developed by [Callaway and Sant’Anna \(2021\)](#). Since many municipalities were never audited (3,359), we always use them as a control group. Regarding inference, we cluster standard errors at the municipality level, and our inference procedure adjusts for multiple hypothesis testing ([Callaway and Sant’Anna, 2021](#)).

4. Results

4.1. Audits and Bureaucratic Selection

We begin our analysis by evaluating how anti-corruption audits affect the total number of municipal public employees. In Table 2, we present our main results. We estimate average treatment effects on the treated (ATT) using [Callaway and Sant’Anna \(2021\)](#). Panels A and B delineate the outcomes for qualified and unqualified employees, respectively. Column (1) shows the effect on the total number of employees, while columns (2), (3), and (4) separately present the effects for managers, bureaucrats, and FHS employees. Audits have a positive effect on the number of qualified public employees, resulting in a 4.4% increase. The audits do not affect the number of unqualified employees. The increase occurs among bureaucrats (4.9%) and more strongly among FHS employees (8.4%). The audits do not affect the number of qualified managers.²⁰ The audits also do not affect the number of unqualified employees within any particular occupational group.

We also examine how the impact on the number of qualified employees changes over time using event-study estimators. Figure 4 shows the results on qualified bureaucrats and FHS employees. While the improvement amongst bureaucrats takes longer to materialize, we observe an improvement amongst FHS employees as early as the second year following the audit, with effects increasing over time.

Table 7 in Appendix 6 evaluates the robustness of our main findings. Panel A presents effects on qualified hires, while Panel B presents effects on unqualified hires. In Columns 1 to 4, we measure qualifications using the educational mismatch measure developed by [Colonnelli et al. \(2020\)](#), which leverages manually collected data on the ideal educational qualifications for a subset of all occupations. The coefficients for qualified employees are remarkably similar in magnitude and statistical significance as to those presented in Table 2. However, using this measure, we find a 5.3% increase in the number of unqualified FHS employees (significant at the 10% level).²¹ In Columns 5 to 7 we apply the $\log(x)$ transformation to counting variables.

²⁰It is important to note that while unskilled doctors, teachers or nurses may have clear implications for state effectiveness, it may be the case that managers’ ability is better captured by a more holistic set of characteristics, as shown by the CEO fixed-effects literature (see, e.g., [Bertrand and Schoar \(2003\)](#)). Similar arguments apply to frontline-low skill employees, whose quality we cannot measure.

²¹As mentioned previously, the key difference between our measure and theirs lies in the fact that we require technicians (ISCO major group 3, a subset of FHS employees) working in the health and education sectors to have a full tertiary degree in order to be classed as qualified. These individuals mainly work as nursing technicians, dental technicians, early childhood teachers, and other similar professions. In Brazil, individuals intending to work in these professions generally take “technical courses”, which are a form of tertiary education.

Table 2: Audits and Bureaucratic Selection

	(1) Total	(2) Managers	(3) Bureaucrats	(4) FHS
<i>Panel A: Qualified</i>				
PostAudits	0.044 (0.020)	0.012 (0.023)	0.049 (0.025)	0.084 (0.027)
Observations	68,796	68,796	68,796	68,796
Avg dep var	4.824	1.777	3.621	4.079
<i>Panel B: Unqualified</i>				
PostAudits	0.002 (0.017)	0.009 (0.031)	0.002 (0.030)	0.034 (0.028)
Observations	68,796	68,796	68,796	68,796
Avg dep var	4.891	2.547	2.539	4.292
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes

Notes. This table shows how audits affect the number of public municipal employees, by occupational category and qualification. Due to multiple zero counts, we transform any dependent variable y via $(\log(y+1))$. Due to the staggered implementation of the audits, results are obtained using Callaway and Sant’Anna (2021). This estimator requires us to balance the panel in calendar time. We use never-treated municipalities as the control group. Our analysis covers a window of $[-4, +8]$ years around the audit year. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. *Avg dep var* is computed using eligible non-audited municipalities and audited municipalities in the year before the audit. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

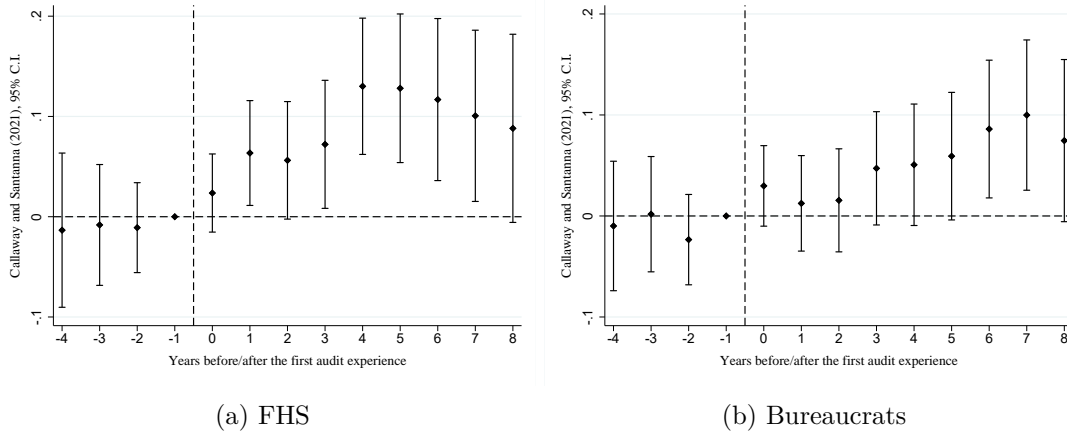


Figure 4: Audits' Effects on the Number of Qualified Employees

Notes. This figure reports the dynamic effects of audits on the number of qualified public municipal employees, by occupational category. Due to multiple zero counts, we transform any dependent variable y via $(\log(y+1))$. Due to the staggered implementation of the audits, results are obtained using Callaway and Sant’Anna (2021). This estimator requires us to balance the panel in calendar time. We use never-treated municipalities as the control group. Our analysis covers a window of $[-4, +8]$ years around the audit year. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. Robust standard errors are clustered at the municipality level, and we show 95% confidence intervals.

Note that in this case, the outcome is identified in municipalities with at least one employee in each occupation. Due to the existence of many municipalities with no managers in the public

sector, and to avoid large changes in the composition of the sample, we exclude the results for managers from consideration in this case. Results for qualified and unqualified hires are all of similar significance and magnitude as the results presented in Table 2.

Taken together, the results indicate that, overall, audits increase the number of public sector employees, with the increase being driven by qualified hires. Moreover, the increase is particularly strong for FHS employees. We interpret these overall patterns as evidence that bureaucratic selection improves in response to anti-corruption audits, especially among professions that directly impact the provision of public goods and require qualifications to be performed effectively. The effect exists already in the short term for these positions, and persist afterwards.

4.2. Political Incentives, Recruitment Effort, and Patronage

Table 3 depicts additional results which help interpret our key finding of an increase in qualified hires. In this analysis we focus on FHS employees for two main reasons. First, they are the occupational category for which the strongest increases in the number of qualified employees are observed. Second, multiple papers in the state capacity literature document the importance of these state employees for public service delivery. Table 8 in Appendix 6 presents similar results for bureaucrats (the other occupational class for which audits increase the number of qualified hires).²²

Panel A shows that the increase in qualified hires is entirely driven by municipalities with above-median levels of detected corruption or a mayor that was not term-limited. More specifically, Columns 2 and 4 show that, in municipalities where a below-median level of corruption was detected or in which the incumbent mayor was term-limited, audits do not affect the number of qualified FHS employees. On the other hand, Columns 1 and 3 show that, in municipalities where an above-median level of corruption was detected (a mayor not facing term limits was audited), audits induce a 12.6% (7.4%) increase in the number of qualified

²²Although results for bureaucrats roughly follow the same pattern as for FHS employees, there are two main differences. First, for bureaucrats, patronage does not decrease. This can be explained by the fact that these relatively low-ranking positions in the bureaucracy are not allocated to campaign donors of the mayor. Second, for bureaucrats, effects are not heterogeneous depending on whether the mayor is term-limited. This can be explained by the fact that mayors might be uncertain about the extent to which hiring qualified bureaucrats increases the quality of public service delivery (and hence generates votes for the incumbent), so that the strength of electoral concerns does not mediate the audits' effects on this professional category. Besides those two main differences, there is a marginally significant and small negative effect on the share of bureaucrats hired via civil service examination. This result is consistent with our more general finding whereby the improvement in bureaucratic selection is not mediated by an increase in meritocratic hires.

FHS employees. Since audits revealing high levels of corruption or affecting a mayor not facing term limits generate the strongest political accountability shocks (by reducing the incumbent’s chances of re-election ([Ferraz and Finan, 2008](#))), this result is consistent with mayors’ political incentives being a key mediator of audits’ effects on bureaucratic selection.

Column 1 in Panel B shows that, relative to the dependent variable mean, audits lead to an increase of 7.64% in wages paid to new qualified hires. Consistent with municipalities engaging in an effort to recruit qualified individuals, we do not see effects on wages paid to new unqualified hires (as shown by Column 2).²³ This interpretation is in line with previous work showing that offering larger wages is an effective way of attracting better workers to the public sector in similar contexts such as Mexico ([Dal Bó et al., 2013](#)) and Peru ([Bobbá et al., 2021](#)).²⁴ Column 3 in Panel B shows that, relative to the dependent variable mean, audits reduce the share of municipal public sector jobs allocated to campaign donors of the incumbent mayor by 57.14%.²⁵ Since, on average, less than 1% of municipal FHS employees are campaign donors of the mayor, this amounts to roughly 1 less campaign donor of the mayor being hired as a FHS employee.²⁶ Since patronage hires are of lower average quality (see, e.g. [Colonnelli et al. \(2020\)](#)), this result is consistent with mayors reducing patronage to improve the quality of the bureaucracy.

Column 1 in Panel C shows that audits do not affect the number of qualified FHS employees hired by the state or federal government. Since mayors cannot easily influence these hires, this result is inconsistent with audits generating an improvement in bureaucratic selection that is independent of the mayor. Column 2 in Panel C shows that audits do not affect the share of public sector employees hired via civil service examination. This is inconsistent with the improvement in bureaucratic selection being mediated by an increase in meritocratic hires. Finally, Column 3 in Panel C shows that audits do not affect the average age of public sector employees. This is inconsistent with the improvement in bureaucratic selection being a mechanical consequence of new hires being disproportionately drawn from younger cohorts, who are better educated on average. This resonates with the results found in [Xun \(2024\)](#), showing that audits reduce the attractiveness of public sector positions for recent college graduates.

²³Although not directly testable, it is possible that these new costlier hires are funded by the sizable reduction in corruption leakage that is induced by the audits, as documented in [Avis et al. \(2018\)](#).

²⁴See [Ashraf et al. \(2020\)](#) for evidence from Zambia.

²⁵This result echoes [Barbosa and Ferreira \(2023\)](#), who, in the same context, find that audits reduce the effect of a particular political group rising to power on the share of jobs allocated to individuals belonging to that group.

²⁶It is important to note that these are only the patronage hires that we can precisely observe. This result should be interpreted as a best approximation to how audits affect forms of patronage that go beyond hiring campaign donors (such as hiring street-level supporters).

Table 3: Political Incentives, Recruitment Effort, and Patronage

<i>Panel A: Qualified Hires, by Strength of Political Accountability Shock</i>				
	Corruption		Mayor's Term	
	(1) Above Median	(2) Below Median	(3) Not Term-Limited	(4) Term-Limited
PostAudits	0.126 (0.059)	0.029 (0.051)	0.074 (0.036)	0.028 (0.076)
Observations	50,298	50,605	56,415	48,550
Avg dep var	4.092	4.092	4.088	4.091
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
<i>Panel B: Recruitment Effort and Patronage</i>				
	(1) Wages of New Qualified Hires	(2) Wages of New Unqualified Hires	(3) Mayor's Donors	
PostAudits	126.447 (56.143)	-10.411 (14.228)	-0.004 (0.002)	
Observations	53,400	53,206	49,893	
Avg dep var	1775.823	835.387	0.007	
Year FE	Yes	Yes	Yes	
Municipality FE	Yes	Yes	Yes	
<i>Panel C: Hires by the State/Federal Government, Meritocracy, and Employees' Age</i>				
	(1) Qualified Hires, State/Federal	(2) Share Merit-Based	(3) Employees' Age	
PostAudits	0.008 (0.015)	0.001 (0.006)	0.130 (0.230)	
Observations	68,642	62,581	63,722	
Avg dep var	0.253	0.829	37.104	
Year FE	Yes	Yes	Yes	
Municipality FE	Yes	Yes	Yes	

Notes. Panel A shows how audits affect the number of qualified FHS municipal employees, by detected levels of corruption and mayor term. Panel B shows how audits affect the wages of new municipal hires of FHS employees (by qualification) and the share of campaign donors of the incumbent mayor amongst municipal FHS employees. Panel C shows how audits affect the number of qualified FHS state or federal employees, the share of municipal FHS employees hired via civil service examination, and the average age of municipal FHS employees. Due to multiple zero counts, we transform the dependent variables in Panel A and the dependent variable in Column 1 of Panel C via $(\log(y + 1))$. Due to the staggered implementation of the audits, results are obtained using [Callaway and Sant'Anna \(2021\)](#). This estimator requires us to balance the panel in calendar time. We use never-treated municipalities as the control group. Our analysis covers a window of $[-4, +8]$ years around the audit year. *Avg dep var* is computed using eligible non-audited municipalities and audited municipalities in the year before the audit. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Taken together, the results depicted in Table 3 are consistent with an interpretation whereby audits, by strengthening political accountability, increase mayors' incentive to perform well in office. To achieve this objective, mayors demand a reduction in patronage and new qualified hires to be made. To attract better candidates, wages paid to new qualified hires are increased.

5. Implications for Public Service Delivery

A large and growing literature shows that bureaucratic selection is a key determinant of state performance.²⁷ The results from this literature suggest that the increase in qualified hires induced by audits should have a positive impact on public service delivery.²⁸

Unfortunately, since audits affected multiple determinants of public service delivery – such as the amount of federal transfers to municipalities (Brollo et al., 2008), corruption (Avis et al., 2018), tax compliance (Montenegro, 2020), and economic activity (Colonnelli and Prem, 2022) – we are unable to make any causal statements about the effect of the new hires induced by the audits on public service delivery. Still, motivated by the aforementioned literature, we conduct a suggestive correlational analysis of the implications of our findings for public service delivery.

We focus on the education sector for three main reasons. First, in addition to the aforementioned literature on the importance of bureaucratic selection for the delivery of education (Busso et al., 2024; Muñoz and Prem, 2024; Leaver et al., 2021; Brown and Andrabi, 2020; Estrada, 2019) there is policy interest, well-exemplified by point 4.c and metric 4.c.1 within the UN’s Agenda 2030, whereby the hiring of qualified teachers is seen as a way to attain Goal 4 (“Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”).²⁹ Second, Brazilian municipalities play a key role in providing primary education, an important driver of early-life human capital accumulation. Third, we have access to a school-level panel with information on test scores and employees. This increases the informativeness of our correlation analysis by allowing us to sequentially include a host of fixed effects in our analysis (in a vein similar to Ferraz et al. (2012)).

We begin by studying how audits affect the number of qualified FHS employees in the education sector. We focus on FHS employees for two main reasons. First, these are the workers directly affecting public service delivery. Second, the school-level data provides information about a subset of these workers (professionals, ISCO major code 2), which we can match to

²⁷It has been shown that the selection of public sector employees affects the delivery of education (Busso et al., 2024; Muñoz and Prem, 2024; Leaver et al., 2021; Brown and Andrabi, 2020; Estrada, 2019), healthcare (Otero and Munoz, 2022; Weaver, 2021; Deserranno, 2019), justice (Dahis et al., 2023; Brassiolo et al., 2021), public safety (Ornaghi, 2019), and postal services (Aneja and Xu, 2024). It also impacts tax collection (Xu, 2018), wartime performance (Voth and Xu, 2020), and broader measures of state performance (Riaño, 2023).

²⁸The sheer increase in the size of the bureaucracy, regardless of it being driven by qualified hires or not, could also impact public service delivery in a positive and sizable way (Ganimian et al., 2024).

²⁹Point 4.c reads as follows: “By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States”. Metric 4.c.1 reads as follows: “Proportion of teachers with the minimum required qualifications, by education level”.

school-level test scores.³⁰ Table 4 shows the effects of audits on FHS employees in the education sector in general (column 1), for professionals (ISCO major code 2) and technicians (ISCO major code 3). We see that audits induce an increase of 8.8% in the number of qualified FHS employees in the education sector. Moreover, the positive effect on FHS employees working in the education sector is driven both by professionals (such as elementary education teachers, for which there is a 6.9% increase) and technicians (such as early childhood teachers), for which there is a 8.5% increase.

Table 4: Effects of Audits on Qualified FHS Employees – Education Sector

	(1) FHS	(2) Professionals	(3) Technicians
PostAudits	0.088 (0.031)	0.069 (0.035)	0.085 (0.036)
Observations	68,796	68,796	68,796
Avg dep var	3.518	2.989	1.523
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes

Notes. This table shows how audits affect the number of municipal FHS employees working in the education sector. Column 1 presents results for all FHS employees (major ISCO codes 2 and 3), Column 2 for professionals (major ISCO code 2) and Column 3 for technicians (major ISCO code 3). Due to multiple zero counts, we transform any dependent variable y via $(\log(y + 1))$. Due to the staggered implementation of the audits, results are obtained using Callaway and Sant’Anna (2021). This estimator requires us to balance the panel in calendar time. We use never-treated municipalities as the control group. Our analysis covers a window of $[-4, +8]$ years around the audit year. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. *Avg dep var* is computed using eligible non-audited municipalities and audited municipalities in the year before the audit. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We now suggestively investigate whether these additional qualified hires may have had positive implications for the delivery of public education services. Table 5 presents a series of school-level correlations between the number of qualified teachers and standardized test scores, using school-by-year data. Panel A shows results for the fourth grade, the last grade of lower primary education. Panel B shows results for the eighth grade, the last grade of upper primary education. The specification in Column 1 includes only a year fixed-effect, absorbing all year-specific factors which affect the number of qualified teachers and students’ test scores (e.g. the difficulty of the standardized exam in a given year, or the amount of federal funds available for hiring teachers in municipal public schools). Using this specification, there is a significant and positive association at school level between the number of qualified teachers and standardized test scores, for both grades. In Column 2, we include municipality FE, absorbing all constant municipality-specific factors which affect the number of qualified teachers and students’ test scores (e.g. past municipality-specific investments in school infrastructure). Using this

³⁰Recall that FHS employees are those with ISCO major code 2 or 3.

specification, there is still a significant and positive association at school level between the number of qualified teachers and standardized test scores, for both grades. In Column 3, we include municipality-by-year FE, absorbing all factors which affect the number of qualified teachers and students' test scores in a given municipality over time (e.g. trends in municipal expenditure on education). By including these fixed effects, we leverage variation coming only from schools located in the same municipality. Using this specification, there is still a significant and positive association at school level between the number of qualified teachers and standardized test scores, for both grades. In Column 4, we include school FE, absorbing all constant school-specific factors which affect the number of qualified teachers and students' test scores in a given school over time (e.g. past school-specific investments in school infrastructure). Using this specification, there is still a significant and positive association at school level between the number of qualified teachers and standardized test scores, for both grades (at a lower significance level, for the 8th grade). Finally, in Column 5, we include time-varying school controls, destined to capture time-varying determinants of the number of qualified teachers and students' test scores in a given school over time (e.g. trends in school-specific investments in infrastructure). Using this specification, there is still a significant and positive association at school level between the number of qualified teachers and standardized test scores, for both grades (but at a lower significance level, for the 8th grade).

These results, together with the aforementioned literature, suggest that the qualified hires induced by the audits should have had positive implications for the quality of public service delivery. Given the strong firing rigidities in the Brazilian public sector and the fact that Brazilian municipalities are responsible for the provision of key education and health services, these better hires could potentially improve public service delivery in a permanent fashion.

6. Conclusion

The quality of personnel selection in the public sector is a fundamental driver of effective public service delivery. Yet, adequately qualified public employees are lacking in many parts of the world – particularly so in developing countries. This paper exploits individual-level administrative data on the universe of public sector employees and an anti-corruption program based on randomized audits that took place in Brazil between 2003 and 2015 to investigate whether increases in political accountability can help address this problem. We find that audits,

Table 5: Qualified Teachers and Standardized Test Scores

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: 4th Grade</i>					
Qualified Teachers	6.123 (0.303)	0.326 (0.130)	0.552 (0.070)	0.241 (0.070)	0.229 (0.070)
Observations	107,642	107,642	107,642	107,642	107,642
Avg dep var	193.969	193.969	193.969	193.969	193.969
<i>Panel B: 8th Grade</i>					
Qualified Teachers	9.290 (0.624)	2.652 (0.280)	3.465 (0.205)	0.411 (0.208)	0.388 (0.209)
Observations	30,635	30,635	30,635	30,635	30,635
Avg dep var	240.104	240.104	240.104	240.104	240.104
Year FE	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	Yes	Yes	Yes	Yes
Municipality-by-year FE	No	No	Yes	Yes	Yes
School FE	No	No	No	Yes	Yes
School Controls	No	No	No	No	Yes

Notes. This table presents school-level correlations between the number of qualified teachers and standardized test scores. We transform the count of qualified teachers y via $(\log(y + 1))$. Our final sample comprises 31,496 municipal public schools in Brazil for the years 2009, 2011, 2013 and 2015. *Avg dep var* is computed using the mean of the dependent variable in the regression sample. The time varying school controls correspond to filtered water, public sewer system, waste collection service, library, computer equipment, internet, and the share of black students. Robust standard errors are clustered at the school level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

one of the most common transparency initiatives across the world aiming at generating the “right” political incentives, induce an immediate and sustained improvement in the quality of the match between the skills and tasks performed by public employees. The improvement occurs mainly for frontline positions that require qualifications and directly affect public service delivery. In terms of mechanisms, our results are consistent with an interpretation whereby audits generate sustained political incentives to improve bureaucratic selection. To achieve this objective, the discretionary allocation of public sector jobs to politically connected individuals is decreased. Moreover, wages for new qualified hires are increased, to attract better workers to the public sector.

More broadly, this paper suggests that, at least in some settings, transparency might enhance public capacity not only by reducing the leakage of fiscal resources via corruption but also by helping create the necessary political incentives for a qualified bureaucracy to flourish. Nonetheless, in light of evidence that in other contexts transparency shocks can increase corrupt hiring practices (Olken, 2007), future work should evaluate whether our results generalize to different settings – particularly those where the political accountability shocks induced by transparency might be less strong.

Appendix A

Table 6: Balance Test

	(1) Ever-Treated	(2) 03-05	(3) 06-08	(4) 09-11	(5) 12-15
Share of candidates for mayor that belong to a traditional parties (PT/PMDB/PSDB)	0.018 (0.010)	0.019 (0.009)	0.004 (0.008)	0.002 (0.007)	0.002 (0.006)
Share of candidates for mayor that were born in Brazil	-0.004 (0.004)	0.000 (0.004)	-0.007 (0.003)	0.000 (0.003)	-0.000 (0.003)
Average candidate for mayor's age	-0.009 (0.013)	-0.002 (0.011)	-0.013 (0.009)	-0.011 (0.009)	0.011 (0.007)
Share of candidates for mayor that are male	0.000 (0.007)	0.006 (0.006)	0.001 (0.005)	0.001 (0.005)	-0.008 (0.004)
Share of candidates for mayor that are college-educated	-0.004 (0.012)	0.006 (0.011)	-0.002 (0.009)	-0.011 (0.008)	-0.001 (0.007)
Share of candidates for mayor that are married	0.000 (0.008)	0.003 (0.006)	-0.005 (0.006)	-0.002 (0.006)	0.001 (0.005)
Elected mayor belongs to a traditional parties (PT/PMDB/PSDB)	-0.021 (0.012)	-0.010 (0.011)	-0.015 (0.009)	-0.009 (0.009)	-0.000 (0.007)
Elected mayor was born in Brazil	-0.002 (0.004)	-0.004 (0.004)	0.003 (0.003)	0.002 (0.003)	-0.003 (0.003)
Elected mayor was born in the state s/he was elected	-0.005 (0.006)	0.001 (0.005)	-0.000 (0.004)	-0.007 (0.004)	-0.002 (0.003)
Elected mayor's age	0.016 (0.014)	0.015 (0.012)	-0.004 (0.010)	0.020 (0.010)	-0.004 (0.008)
Elected mayor is male	0.001 (0.005)	-0.001 (0.005)	0.001 (0.004)	0.000 (0.004)	0.000 (0.003)
Elected mayor is college-educated	0.002 (0.012)	-0.011 (0.011)	0.000 (0.009)	0.010 (0.009)	0.007 (0.007)
Elected mayor is married	0.008 (0.007)	0.002 (0.006)	0.006 (0.005)	0.008 (0.005)	-0.001 (0.004)
Average log of household income per capita (2000 Census)	0.036 (0.025)	0.045 (0.022)	-0.011 (0.018)	0.016 (0.018)	0.009 (0.014)
Share of households below the BF threshold (2000 Census)	0.024 (0.021)	0.035 (0.019)	-0.007 (0.015)	0.007 (0.015)	0.008 (0.012)
Household income Gini (2000 Census)	0.007 (0.007)	0.013 (0.007)	-0.003 (0.005)	0.005 (0.005)	-0.004 (0.004)
Population (2000 Census)	0.007 (0.013)	0.007 (0.012)	0.001 (0.010)	0.009 (0.010)	-0.003 (0.008)
Share of urban households (2000 Census)	0.013 (0.011)	0.019 (0.010)	0.006 (0.008)	-0.005 (0.008)	-0.000 (0.006)
Share of male citizens (2000 Census)	-0.004 (0.010)	-0.003 (0.009)	0.002 (0.007)	-0.010 (0.007)	0.004 (0.006)
Share of literate citizens (2000 Census)	-0.002 (0.028)	0.013 (0.025)	-0.031 (0.020)	0.022 (0.020)	-0.001 (0.016)
Average years of education (2000 Census)	-0.024 (0.029)	-0.040 (0.026)	0.025 (0.021)	-0.034 (0.020)	0.006 (0.017)
Share of informal workers (2000 Census)	0.008 (0.009)	-0.002 (0.009)	0.001 (0.007)	0.007 (0.007)	0.010 (0.005)
Existence of AM/FM Radio (2002 MUNIC)	0.003 (0.008)	0.007 (0.007)	-0.004 (0.006)	0.001 (0.006)	0.001 (0.005)
Existence of TV (2002 MUNIC)	-0.005 (0.008)	-0.007 (0.007)	0.003 (0.006)	0.000 (0.005)	-0.003 (0.004)
Number of Qualified Bureaucrats	0.005 (0.011)	0.005 (0.010)	0.003 (0.008)	-0.002 (0.007)	0.002 (0.006)
Number of Qualified Managers	0.012 (0.010)	0.010 (0.009)	0.004 (0.007)	0.004 (0.007)	0.001 (0.006)
Number of Qualified Frontline High-Skilled Employees	-0.012 (0.010)	-0.006 (0.009)	-0.006 (0.008)	-0.005 (0.008)	-0.006 (0.006)
Number of Unqualified Managers	-0.010 (0.009)	-0.006 (0.008)	-0.009 (0.007)	-0.003 (0.006)	-0.001 (0.005)
Number of Unqualified Bureaucrats	-0.016 (0.010)	-0.009 (0.009)	-0.008 (0.007)	-0.005 (0.007)	-0.002 (0.006)
Number of Unqualified Frontline High-Skilled Employees	0.002 (0.011)	-0.004 (0.010)	0.005 (0.008)	0.002 (0.008)	-0.000 (0.007)
Observations	4,914	4,078	3,697	3,668	3,545
State FE	Yes	Yes	Yes	Yes	Yes
R ²	0.0275	0.0323	0.0170	0.0176	0.0165

Notes. This table presents the coefficients obtained from a regression of municipalities' characteristics on the outcome variable *Ever-Treated*, which indicates whether the municipality was audited by the program at least once. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. Our source is RAIS, and the sample is at the municipality-year level. In Column (1), we include municipalities' characteristics from the year 2002 as regressors. In Columns (2) to (5), the regressors represent municipalities' characteristics from the year preceding the indicated year. For instance, Column (3) utilizes characteristics set in 2005 ($t - 1$). This does not apply to the census and municipality characteristics from the census of 2000 and 2002 MUNIC. All specifications incorporate state-fixed effects. Each regressor is standardized using its mean and standard deviation. Robust standard errors are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Audits and Bureaucratic Selection - Robustness Checks

	Alternative Measure				Log		
	(1) Total	(2) Managers	(3) Bureaucrats	(4) FHS	(5) Total	(6) Bureaucrats	(7) FHS
<i>Panel A: Qualified</i>							
PostAudits	0.042** (0.020)	-0.033 (0.023)	0.054** (0.025)	0.067** (0.026)	0.043*** (0.016)	0.047** (0.022)	0.062** (0.026)
Observations	68,796	68,796	68,796	68,796	51,254	51,254	51,254
Avg dep var	5.515	1.059	3.631	4.475	4.992	3.717	4.392
<i>Panel B: Unqualified</i>							
PostAudits	0.018 (0.021)	-0.020 (0.029)	-0.004 (0.030)	0.053* (0.031)	0.016 (0.014)	0.030 (0.032)	0.017 (0.020)
Observations	68,796	68,796	68,796	68,796	51,229	48,678	51,037
Avg dep var	4.878	1.350	2.517	3.709	4.937	2.599	4.488

Notes. This table shows how audits affect the number of public municipal employees, by occupational category and qualification. In Columns 1 to 4, we use the qualification measure of [Colonnelli et al. \(2020\)](#), which applies to a subset of all occupations but exploits manually collected information on the educational requirement of each occupation. Due to multiple zero counts, we transform the dependent variable y via $(\log(y + 1))$. In Columns 5 to 7, we use our qualification measure and transform the dependent variable y via $(\log(y))$. Due to the staggered implementation of the audits, results are obtained using [Callaway and Sant'Anna \(2021\)](#). This estimator requires us to balance the panel in calendar time. We use never-treated municipalities as the control group. Our analysis covers a window of $[-4, +8]$ years around the audit year. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. *Avg dep var* is computed using eligible non-audited municipalities and audited municipalities in the year before the audit. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Audits' Effects on Qualified Public Sector Bureaucrats

<i>Panel A: Qualified Hires, by Strength of Political Accountability Shock</i>				
	Corruption		Mayor's Term	
	(1) Above Median	(2) Below Median	(3) Not Term-Limited	(4) Term-Limited
PostAudits	0.105 (0.049)	-0.006 (0.041)	0.003 (0.029)	0.045 (0.058)
Observations	50,298	50,605	56,415	48,550
Avg dep var	3.628	3.626	3.627	3.626
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
<i>Panel B: Recruitment Effort and Patronage</i>				
	(1) Wages of New Qualified Hires	(2) Wages of New Unqualified Hires	(3) Mayor's Donors	
PostAudits	42.309 (24.898)	-177.644 (162.088)	-0.002 (0.002)	
Observations	51,351	35,866	50,240	
Avg dep var	939.429	822.613	0.013	
Year FE	Yes	Yes	Yes	
Municipality FE	Yes	Yes	Yes	
<i>Panel C: Hires by the State/Federal Government, Meritocracy, and Employees' Age</i>				
	(1) Qualified Hires, State/Federal	(2) Share Merit-Based	(3) Employees' Age	
PostAudits	0.006 (0.016)	-0.012 (0.007)	-0.250 (0.191)	
Observations	68,642	62,751	63,722	
Avg dep var	0.267	0.756	35.348	
Year FE	Yes	Yes	Yes	
Municipality FE	Yes	Yes	Yes	

Notes. This table shows the main effects of the audit on the number of qualified public municipal employees by detected levels of corruption and mayor term. We transform the dependent variable by estimating the log transformation ($\log(y_i + 1)$). Results are obtained using [Callaway and Sant'Anna \(2021\)](#). We balance the panel in calendar time and use never-treated municipalities as the control group. It covers the window $[-4, +8]$ years around the audit year. Our final sample comprises 4,914 eligible municipalities in Brazil during the period from 2002 to 2015. Avg dep var is computed using eligible non-audited municipalities and audited municipalities in the year before the audit. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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